

EXHIBIT 11

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re *Inter Partes* Review of:)
U.S. Patent No. 7,432,891)
Issued: October 7, 2008)
Application No.: 10/689,352)
)

For: **Active matrix drive circuit**

**DECLARATION OF MILTIADIS HATALIS, PH.D. IN SUPPORT OF
PETITION FOR INTER PARTES REVIEW
OF U.S. PATENT NO. 7,432,891**

line. *See id.*, 3:1-3 (“The simplest drive scheme for an organic EL panel is to have the organic display medium sandwiched between two sets of orthogonal electrodes (rows and columns).”).

75. A particular row is selected by bringing it to some positive voltage while all unselected row lines remain at ground. Then, a voltage is applied to each column line. Each OLED along the selected row line will illuminate if the voltage on the row line (assuming the anode of the OLEDs are connected to the row line) minus the voltage on the column line is greater than the forward voltage of the OLED, and the greater the voltage the greater the illumination will be. For all unselected row lines, the OLED’s will be switched off and no current will flow due to the nonlinear characteristic of the OLED. Specifically, due to the nonlinear characteristic of the OLEDs, the OLEDs with a grounded anode and a positive cathode voltage will have effectively no current flowing, as the voltage across the diode will be negative and thus less than the minimum positive voltage, i.e. the “forward voltage.” As discussed above, the voltage across the diode (i.e. the difference anode voltage minus cathode voltage) must be above the diode’s “forward voltage” for current to flow. This is in contrast with a linear element such as a resistor, which would have a negative current flowing if arranged in the same way.

76. The ’891 patent discloses that the current measuring and voltage regulating circuit includes a “current measuring circuit at the conductor S” (’891

patent, 3:28-31) for measuring the tapped and supplied drive current, but does not explain the circuitry used for that current measurement. *Id.*, 3:28-31, 3:9-12. Looking at the patent figure, there is a box labeled “U/I” (a current-to-voltage converter, using the symbol U for voltage and I for current) that converts the output current to a voltage signal that is representative of the amount of current (i.e., it “measures” the current, *id.*, 2:4-7). The voltage signal is compared to a “nominal value” by “compar[a]tor 12.” This “nominal value” corresponds to a desired gate voltage for T1 that will produce a “desired value” for the drive current to the OLED. ’891 patent, 3:16-20; *see also id.*, 2:4-7.

77. The ’891 patent states that as a result of the voltage comparison in comparator 12, a “corresponding correcting signal is provided at the input of the image point circuit” by the CMVRC. *Id.*, 2:13-16. This correcting signal is a “voltage signal at the data conduit D,” so that the voltage at the gate of T1 (through T2) is at a level corresponding to a “desired value” in the current. *Id.*, 3:16-21.

78. The current output of T1 is a function of the gate voltage of T1: as the gate voltage of T1 changes, the amount of current output by T1 changes accordingly. *Id.* 3:20-21. In other words, T1 is operated as a controllable current source rather than being used as a switch as discussed above in the Technical Background section. Thus, the ’891 patent states that it “regulate[s]” the “drive current” to a “desired value” by using current feedback (also referred to as “feedback coupling”), where

IX. CONCLUSION

272. For the above reasons, it is my opinion that claims 1-3 of the '891 patent are anticipated and/or rendered obvious by the prior art.

273. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code. I declare under the penalty of perjury that the forgoing is true and correct.

Dated: November 21, 2019



Miltiadis Hatalis